PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Attorney Docket No.: 2950.35US01

Kambe et al. Confirmation No.: 8988

Application No.: 09/558,266 Examiner: L. Furguson

Filed: April 25, 2000 Group Art Unit: 1774

For: SELF-ASSEMBLED STRUCTURES

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the Final Office Action dated February 6, 2003, in which claims 1, 4-16 and 41-53 were finally rejected. A Notice of Appeal was filed on May 6, 2003.

REAL PARTY IN INTEREST

NanoGram Corporation, a Delaware Corporation and a wholly owned subsidiary of NeoPhotonics Corporation, a corporation organized under the laws of the state of Delaware, and having offices at 2911 Zanker Road, San Jose, California, has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefor, as per the Assignments a) recorded at reel 010926 and frame 0777 (for the transfer of the title from the inventors to NeoPhotonics Corporation), and b) an assignment mailed for recordation on April 21, 2003 (for the transfer of the title from Neophotonics to NanoGram Corporation, its wholly owned subsidiary), a copy of which is attached in Appendix A. Note that NeoPhotonics Corporation was formerly called NanoGram Corporation and has retained the name "NanoGram Corporation" as the

name of a wholly owned subsidiary following a formal name change.

RELATED APPEALS AND INTERFERENCES

Applicants are aware of no related appeals.

STATUS OF THE CLAIMS

Claims 1, 4-12, 14-16, 41-43 and 45-53 stand rejected. The status of claims 13 and 44 is unclear since no pending rejections are directed against these claims, although the Examiner has not indicated that they are allowable. The pending claims are listed in Appendix B.

STATUS OF AMENDMENTS

The status of the amendments is unknown since the Advisory Action of April 28, 2003 did not indicate whether or not the Amendment of April 15, 2003 would be entered upon the filing of an Appeal. However, Appellants assume that the amendment was entered since the amendment simplifies the issues for appeal. In particular, the Advisory Action of April 28, 2003 indicated that Applicants' amendment of claim 14 overcame the section 112 rejection. The section 112 rejection is not discussed further. Similarly, since the status of claim 14 is unknown, Applicants do not argue the separate patentability of claim 14.

SUMMARY OF INVENTION

The present invention relates to the organization of self-assembled structures along or within a surface. See, for example, specification at page 4, lines 7-20. Self-assembly techniques take advantage of molecular recognition properties, such as commingling, key-lock relationships and guest-host interactions. Page 4, lines 7-12. The organization of the self-assembled structures provides for the formation of devices, which have the potential of being

integrated into systems. For example, page 7, lines 17-22. Thus, the claimed materials have two levels or organization. At a larger level of organization, domains are organized at selected location for the placement of a self-assembled structure. At a finer scale of organization, within one of the self-assembled locations is a self-assembled structure. In organizing a plurality of self-assembled domains, the different domains may or may not have the same composition and/or self-assembled structure within the domain. For example, page 7, lines 4-22 and page 38, line 28 to page 39, line 23. While the present claims are only directed to the structures themselves, Applicants' specification describes a range of techniques for forming the organized domains within which there are self-assembled structures. For example, page 45, line 32 to page 47, line 28.

Self-assembly involves interactions between a layer and adjacent materials that result in inherent formation of a layer of the material on the layer. For example, page 48, line 16 to page 54, line 3. Applicants' invention is built upon the discovery that boundary forming techniques can be combined with self-assembly approaches to form complex structures with integrated self-assembled domains. The combination of boundary forming techniques with self-assembly is a power combination for the formation of complex structures. Page 39, line 33 to page 40, line 14.

Self-assembly techniques inherently form layered structures. Thus, an entire layer is inherently formed by the self-assembly process, except, for example, as altered using approaches described by Applicants. As described by Applicants, a second level of structure is introduced by a localization technique. This approach results in the plurality of self-assembled structures in localized islands, as claimed by Applicants. These are shown schematically in Figures 7-15. The localization techniques introduce the second level of structure.

In some embodiments, the self-assembly approach uses nanoparticles, which can be highly uniform with average particle sizes in selected ranges. Applicants' specification has an extensive discussion of the formation of suitable nanoparticles using laser pyrolysis.

ISSUES

1. Are claims 1, 4-8, 11, 12, 15, 16, 41-43 and 45-53 obvious under 35 U.S.C. §103(a) over U.S. Patent 5,879,827 to Debe et al.?

2. Are claims 1 and 8-12 anticipated under 35 U.S.C. § 102(b) over U.S. Patent 5,751,018 to Alivisatos et al.?

GROUPING OF CLAIMS

The pending claims fall within 11 groups.

Claims 1, 4, 8-12, 14 and 43 fall within a first group directed to a material having a structure comprising a plurality of self-assembled structures.

Claims 5 and 6 fall within a second group directed to a material having a plurality of self-assembled structures comprising uniform nanoparticles.

Claim 7 falls within a third group directed to a material having a plurality of self-assembled structures with nanoparticles located within pores.

Claim 13 falls within a fourth group directed to a material having a plurality of self-assembled structures with biological macromolecular linkers.

Claims 15, 46-48 and 51 fall within a fifth group directed to a self-assembled formation of inorganic nanoparticles.

Claim 16 and 45 fall within a sixth group directed to a self-assembled formation of uniform inorganic nanoparticles.

Claim 44 falls within a seventh group directed to a material having a plurality of self-assembled structures located along different layers.

Claim 49 falls within an eighth group directed to a self-assembled formation of inorganic nanoparticles integrated into an integrated assembly.

Claim 50 falls within a ninth group directed to a self-assembled formation of inorganic nanoparticles comprising a metal oxide.

Claim 52 falls within a tenth group directed to a self-assembled formation of inorganic nanoparticles comprising a material with a suitable index of refraction.

Claim 53 falls within an eleventh group directed to a self-assembled formation of inorganic nanoparticles having a photonic band gap.

ARGUMENT

I. LEGAL BACKGROUND

A. OBVIOUSNESS

1. The Examiner Bears The Burden Of Demonstrating Obviousness.

The Applicants note that the patent office has the burden of persuasion in showing that the Applicants are not entitled to a patent. "[T]he conclusion of obviousness vel non is based on the preponderance of evidence and argument in the record." In re Oetiker, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). The patent office has the ultimate burden of persuasion in establishing that an applicant is not entitled to a patent. Id. at 1447, concurring opinion of Judge Plager. **"The only determinative issue is whether the record as a whole supports the legal conclusion that the invention would have been obvious."** Id.

"In rejecting claims under 35 U.S.C. §103, the examiner bears the initial burden of presenting a prima facie case of obviousness." In re Rijckaert, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). Prima facie obviousness is not established if all the elements of the rejected claim are not

disclosed or suggested in the cited art. In re Ochiai, 37 USPQ 1127, 1131 (Fed. Cir. 1995). ("The test for obviousness *vel non* is statutory. It requires that one compare the claim's 'subject matter as a whole' with the prior art 'to which said subject matter pertains.'"). **"It is impermissible, however, to simply engage in a hindsight reconstruction of the claimed invention, using applicant's structure as a template and selecting elements from references to fill the gaps."** In re Gorman, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991)(emphasis added).

If the Examiner fails to establish a prima facie case of obviousness, the obviousness rejection must be withdrawn as a matter of law. In re Ochiai, 37 USPQ at 1131 (**"When the references cited by the examiner fail to establish a prima facie case of obviousness, the rejection is improper and will be overturned."** Emphasis added.).

2. There Must Be Motivation In The Art To Modify The Teachings Of the Cited References

The motivation, or suggestion, to modify the teachings of a reference must be either explicitly or implicitly in the references or knowledge "generally available to one of ordinary skill in the art." See, MPEP § 2143.01. Furthermore, "[t]he test for an implicit showing [of motivation] is what the combined teachings, knowledge of one of ordinary skill in the art, and nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." See, MPEP §2143.01 (quoting In re Kotzab, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000)).

The Federal Circuit has provided considerable guidance on establishing obviousness of a claim. "Our case law makes clear that the best defense against hindsight-based obviousness analysis is the rigorous application of the requirement of a teaching or motivation to combine the prior art references." *Ecolochem Inc. v. Southern Edison*, 56 USPQ2d 1065, 1073 (Fed. Cir. 2000). "Therefore, '[w]hen determining the patentability of a claimed invention which combines two known elements, 'the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.' " *Id.*

(quoting *In re Beattie*, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992)(quoting *Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co.*, 221 USPQ 481, 488 (Fed. Cir. 1984))). "The test is not whether one device can be an appropriate substitute for another." *Ruiz v. A.B. Chance Co.*, 57 USPQ2d 1161, 1167 (Fed. Cir. 2000) (emphasis added). In *Ruiz*, the Federal Circuit overturned a district court holding that "it would have been obvious to combine screw anchors and metal brackets, because the need for a bracket 'was apparent.'" *Id.*

3. The References Must Teach Or Suggest All Of The Claim Elements

Prima facie obviousness is not established if all the elements of the rejected claim are not disclosed or suggested in the cited art. In re Ochiai, 37 USPQ 1127, 1131 (Fed. Cir. 1995). ("The test for obviousness *vel non* is statutory. It requires that one compare the claim's 'subject matter as a whole' with the prior art 'to which said subject matter pertains.'"). See also, MPEP 2143.03 "All Claim Limitations Must Be Taught or Suggested," citing In re Royka, 180 USPQ 580 (CCPA 1974). "To establish prima facie obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art." MPEP 2143.03.

To establish prima facie obviousness, all the elements of the claim must be taught or suggested by the cited references without the benefit of hindsight based on the applicant's own disclosure. "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to **the insidious effect of a hindsight syndrome** wherein that which only the inventor taught is used against its teacher." W. L. Gore & Assocs., Inc. v. Garlock, Inc., 220 USPQ 303, 312-13 (Fed. Cir. 1983). **"Skill in the art does not act as a bridge over gaps in the substantive presentation of an obviousness case, but instead supplies the primary guarantee of objectivity in the process."** All-Site Corp. v. VSI International Inc., 50 USPQ2d 1161, 1171 (Fed. Cir. 1999)(emphasis added).

The importance of the principle that the prior art itself must suggest the motivation to modify the teachings of a reference was eloquently stated in In re Rouffet, 47 USPQ2d 1453, 1458 (Fed. Cir. 1998)(emphasis added):

> The Board did not, however, explain what specific understanding or technical principle within the knowledge of one of ordinary skill in the art would have suggested the combination. **Instead the board merely invoked the high level of skill in the field of the art. If such a rote invocation could suffice to supply a motivation to combine, the more sophisticated scientific fields would rarely, if ever, experience a patentable technical advance.** Instead, in complex scientific fields, the Board could routinely identify the prior art elements in an application, invoke the lofty level of skill, and rest its case for rejection. **To counter this potential weakness in the obviousness construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.**

Similar principles must be applied when obvousness is based on the teachings of a single cited reference.

> In appropriate circumstances, a single prior art reference can render a claim obvious. However, there must be a showing of a suggestion or motivation to modify the teachings of that reference to the claimed invention in order to support the obviousness conclusion. This suggestion or motivation may be derived from the prior art reference itself, from the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. **Determining whether there is a suggestion or motivation to modify a prior art reference is one aspect of determining the scope and content of the prior art, a fact question subsidiary to the ultimate conclusion of obviousness.**

Sibia Neurosciences, Inc. v. Cadus Pharaceutical Corp., 55 USPQ2d 1927, 1931 (Fed. Circuit 2000)(internal citations omitted, emphasis added).

4. Differences Between The Scope Of The Prior Art And The Claimed Invention Must Be Evaluated

The two initial factual determinations under a Graham analysis are (A) Determining the scope and content of the prior art and (B) Ascertaining the differences between the prior art and the claims at issue. See MPEP 2141 citing Graham v. John Deere, 383 U.S. 1, 148 USPQ 459 (1966). In evaluating the differences between the prior art and the claimed invention, the invention as a whole must be considered. See MPEP 2141.02 citing Stratoflex, Inc. v. Aeroquip Corp. 218 USPQ 871 (Fed. Cir. 1983). Similarly, a prior art reference must be considered "as a whole, including portions that would lead away from the claimed invention." See MPEP 2141.02 (emphasis in original) citing W. L. Gore & Associates, Inc. v. Garlock, Inc., 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

B. ANTICIPATION

1. A Single Reference Must Disclose Every Element Set Forth In a Claim To Anticipate The Claim

"For a prior art reference to anticipate in terms of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference. **These elements must be arranged as in the claim under review**, but this is not an 'ipsissimis verbis' test." In re Bond, 15 USPQ2d 1566, 1567 (Fed. Cir, 1990)(Internal citations omitted and emphasis added.).

"If the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if that element is 'inherent' in its disclosure. To establish inherency, the intrinsic evidence 'must make it clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" In re Robertson, 49 USPQ2d 1949, 1950, 1951 (Fed. Cir. 1999), citing Continental Can Co. v. Monsanto Co., 20 USPQ2d 1746, 1749 (Fed. Cir. 1991).

"Every element of the claimed invention must be literally present, arranged as in the claim. **The identical invention must be shown in as complete detail as is contained in the patent claim.**" Richardson v. U.S. Suzuki Motor Corp., 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)(Internal citations omitted, and emphasis added.); see also MPEP 2131. "Here, as well, anticipation is **not** shown by a prior art disclosure which is only 'substantially the same' as the claimed invention." Jamesbury Corp. v. Litton Industrial Products, Inc., 225 USPQ 253, 256 (Fed. Cir. 1985)(emphasis added).

II. ANALYSIS

No rejections are presently pending against claims 13 and 44, corresponding to groups 4 and 7, as specified above. Thus, these groups are not discussed further.

A. Rejection Over Debe et al.

The Examiner rejected claims 1, 4-8, 11, 12, 15, 16, 41-43 and 45-53 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,879,827 to Debe et al. (the Debe patent). A copy of the Debe Patent is found in Appendix C. This analysis is organized according to the claim groupings discussed above.

Group 1 Claims

The Debe patent has a relatively complex disclosure. The Examiner has taken the position of attempting to point out elements of Applicants' claimed invention within the Debe patent without regard to the relationship of the elements in the Debe patent. Furthermore, certain elements are completely absent from the Debe patent. Thus, the Examiner has made errors of law with respect to the necessary showing of motivation to modify the teachings of the Debe patent and errors of fact with respect to elements of Applicants' claims being completely absent

from the Debe patent. Thus, the Examiner has failed to make a prima facie showing of obviousness.

In the final Office Action of February 6, 2003 at page 4, in response to Applicants' arguments, the Examiner indicated that "Applicant must show the references instantly cited cannot exhibit the claimed features in order to overcome the rejection." With all due respect, this is an extreme misstatement of the law. It is the **Examiner's burden** to establish prima facie obviousness, not the Applicants to prove patentability. Furthermore, it is the **Examiner's burden** to establish that any inherent features are **necessarily present** in the structures of the cited reference or are otherwise an obvious modification of the explicitly shown features of the cited reference. It is simply not the Applicants' burden to prove patentability. Nevertheless, Applicants have pointed out numerous deficiencies of the Debe patent. The Examiner has fallen far short of establishing prima facie obviousness and in refuting Applicants' arguments for patentability over the Debe patent.

With respect to the Debe patent, with all due respect, Applicants assert that the Examiner has failed to articulate a clear statement of prima facie obviousness. In particular, in the Office Action of July 18, 2001, the Examiner did not assert that the Debe patent discloses a plurality of self-assembled structures - covering a portion of a layer, although these features were and are present in the claim. See paragraph 20 of this Office Action. The Examiner continues to cite back to this Office Action for the full statement of the basis of the rejection. With respect to discrete islands, the Examiner pointed to column 12, lines 65-66. Applicants noted in their response of October 18, 2001 that the islands were not formed from self-assembled structures. In response, the Examiner indicated that the catalyst material is considered self-assembling "because there is no outside force to help with the assembly." See page 6 of the Office Action of April 9, 2002. The Examiner further noted other self-assembled materials in the Debe patent that were not organized into islands. In response, Applicants noted that the only self-assembled

materials in the Debe patent comprised an organic material and not inorganic particles (page 10 of the Amendment of June 19, 2002) and that the formation of the catalyst material noted by the Examiner as forming islands involved a sputtering process not self-assembly (page 9 of the Amendment of April 15, 2003). Sputtering clearly involves outside forces that direct the deposited material toward the substrate surface and cannot reasonably be considered a self-assembly process.

Furthermore, Applicants' claimed invention relates to a self-assembled structure comprising inorganic particles. With respect to inorganic particles, the Examiner points to column 6, lines 62-65. However, these materials relate to a "substrate" not to a self-assembled structure or to particles. For support for nanoscopic particles, the Examiner points to column 4, lines 56-60 of the Debe patent. However, these nanoscopic particles are organic (perylene red), which are coated with an inorganic catalytic material, which are NOT self-assembled according to the teachings of the Debe patent. See, for example, the Debe patent at column 7, lines 16-67. For the assertion that these nanoscopic particles self-assemble, the Examiner (at the bottom of page 5 of the Office Action) points to the abstract, column 6, lines 1-14 and Fig. 4. Applicants do not understand this assertion since there is no discussion of self-assembly in the abstract or at column 6, lines 1-14, and Figures 4A and 4B are directed to an **apparatus** for practicing the processing of the Debe patent. In the middle of page 5 of the Final Office Action of February 6, 2003, the Examiner noted that the Debe patent discloses self-assembled layers at column 10, line 62. The self-assembled layers relate to the coating material and not the acicular support particles described at column 4, lines 56-60. Furthermore, as noted previously by Applicants, these self-assembled layers at column 10, line 62 relate to conductive **organic** polymers and NOT to inorganic particles.

In summary, the Debe patent does not teach or suggest self-assembled inorganic particles or a plurality of self-assembled structures localized within selected, separate locations. Thus, the Debe patent does not teach or suggest all of the elements of Applicants' claimed

invention. Furthermore, the Debe patents fails completely to suggest the relationships of separate locations/islands or processes that could be used to form such selected, separate locations of self-assembled structures. In short, the Debe patent does not come close to rendering Applicants' claimed invention prima facie obvious.

Also, the Examiner has not described the differences between the Debe patent and Applicants' claimed invention and how the Debe patent motivates modification of the explicit teaching to form Applicants' claimed invention. Critical features of a required Graham analysis to evaluate obviousness are completely lacking in the Examiner's analysis. In particular, the Examiner has not pointed to any teachings in the art to motivate the formation of self-assembled island in the formation of a fuel cell membrane. The Examiner has fallen far short of establishing prima facie obviousness, and the rejection should be withdrawn.

Group 2 Claims

Claims 5 and 6 depend from claim 1. Therefore, these claims are patentable over the Debe patent for the reasons described under the group 1 analysis. In addition, the Examiner has failed to assert how the Debe patent teaches or suggests the particle uniformity that is the subject of claims 5 and 6. While the Examiner acknowledges that the Debe patent does not explicitly disclose the range of average particle size (Office Action of February 6, 2003 at page 2), the Examiner asserts that the reference has the same materials and the same function as applicants. However, the materials described in the Debe patent are dramatically different from Applicants particles formed by laser pyrolysis, and the functions are not the same at all since Applicants' specification does not describe fuel cell catalyst membranes. Thus, the Examiner has failed to assert a case of prima facie obviousness with respect to claims 5 and 6. Thus, this rejection should be withdrawn.

Group 3 Claims

Claim 7 depends from claim 1. Therefore, claim 7 is patentable over the Debe patent for the reasons described above under the group 1 analysis. Furthermore, the Examiner has not asserted that the Debe patent teaches or suggests nanoscale particles within **pores**. Therefore, the Examiner clearly has not asserted a prima facie case of obviousness with respect to claim 7. This rejection should be withdrawn.

Group 5 Claims

With respect to the features of claim 15 and claims depending from claim 15, the Examiner indicated that the average particle sizes followed since the Debe reference has the same materials for the same function. With all due respect, this statement is not true on many levels. The materials described in the Debe patent are not the same materials. In particular, the Debe patent does not teach or suggest self-assembled inorganic particles, as claimed by Applicants. The Debe patent teaches nanoscopic catalyst particles formed by vapor deposition. See, for example, column 4, lines 21-24. Since the Debe patent does not teach or suggest self-assembled inorganic particles, the Debe patent does not render claim 15 or claims depending from claim 15 obvious. This rejection should be withdrawn.

Group 6 Claims

Claims 16 and 45 depend from claim 15. Therefore, these claims are patentable over the Debe patent for the reasons described under the group 5 analysis. In addition, the Examiner has failed to assert how the Debe patent teaches or suggests the particle uniformity that is the subject of claims 16 and 45. While the Examiner acknowledges that the Debe patent does not explicitly disclose the range of average particle size (Office Action of February 6, 2003 at page 2), the Examiner asserts that the reference has the same materials and the same function as

applicants. However, the materials described in the Debe patent are dramatically different from Applicants particles formed by laser pyrolysis and the functions are not the same at all. Thus, the Examiner has failed to assert a case of prima facie obviousness with respect to claims 16 and 45. Thus, this rejection should be withdrawn.

Group 8 Claims

Claim 49 depends from claim 15 and is thus patentable for the same reasons discussed above for group 5 claims. In addition, the Examiner has failed to assert that the Debe patent teaches or suggests an integrated assembly. Therefore, the Examiner has failed to assert a prima facie case for the obviousness of claim 49. This rejection should be withdrawn.

Group 9 Claims

Claim 50 depends from claim 15 and is thus patentable for the same reasons discussed above for group 5 claims. In addition, the Debe patent does not teach or suggest metal oxide nanoparticles. The Debe patent discloses metal oxide microstructures at column 10, lines 14-17, but not metal oxide nanoparticles. Thus, the Debe patent clearly does not render Applicants' group 9 claims prima facie obvious. This rejection should be withdrawn.

Group 10 Claims

Claim 52 depends from claim 15 and is thus patentable for the same reasons discussed above for group 5 claims. Furthermore, the Debe patent does not teach or suggest nanoparticles with an index-of-refraction suitable for transmitting visible light. The Debe patent teaches catalyst particles formed from metals, which would not be suitable for transmitting visible light. See, for example, column 5, lines 5-48. Thus, the Debe patent clearly does not render claim 52 prima facie obvious. This rejection should be withdrawn.

Group 11 Claims

Claim 53 depends from claims 15 and is thus patentable for the same reasons discussed above for group 5 claims. In addition, the Examiner has failed to assert how the Debe patent teaches or suggests the particle uniformity that is the subject of claims 5 and 6. While the Examiner acknowledges that the Debe patent does not explicitly disclose the range of average particle size (Office Action of February 6, 2003 at page 2), the Examiner asserts that the reference has the same materials and the same function as applicants. However, the materials described in the Debe patent are dramatically different from Applicants particles formed by laser pyrolysis and the functions are not the same at all. Thus, the Examiner has failed to assert a case of prima facie obviousness with respect to claims 5 and 6. Thus, the rejection of claim 53 should be withdrawn.

Summary of Obviousness Rejections

The Examiner has failed to establish prima facie obviousness of any of Applicants' claims based on the Debe patent. Applicants respectfully request the withdrawal of the rejection of claims 1, 4-8, 11, 12, 15, 16, 41-43 and 45-53 under 35 U.S.C. § 103(a) as being unpatentable over the Debe patent.

B. Rejections Over Alivisatos et al.

The Examiner rejected claims 1 and 8-12 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 5,751,018 to Alivisatos et al. (the Alivisatos patent). A copy of the Alivisatos patent is found in Appendix D. These rejections are discussed according to the claim groups described above.

Group 1 and 2 Claims

The Examiner asserts that the Alivisatos patent discloses self-assembled structures organized into an assembly of clusters. In response to Applicants' arguments that the Alivisatos patent does not disclose separate, selected locations, the Examiner argued that "the reference discloses self-assembled monolayers organized into an assembly of clusters (abstract; column 6, lines 1-14) and Figure 4 shows a plurality of separate, selected locations." Office Action of April 15, 2003 at page 5. Applicants maintain that the Examiner's position is based on errors of law and/or errors of fact as described in the following discussion.

The Examiner asserted that Figure 4 of the Alivisatos patent discloses a plurality of separate, selected locations. However, to evaluate the Examiner's position, the language of Applicants' claim 1 should be examined in context. According to Applicants' claim 1, the material comprises "a plurality of self-assembled structures." It is this plurality of structures that are organized at "separate, selected locations." In other words, one of the plurality of structures is at a first selected location, a second of the plurality of structures is at a second selected location separate from the first location, and additional structures, if the plurality comprises more than two structures, are similarly placed at a separate, selected location. **Each structure** comprises a self-assembled collection of inorganic particles, according to the language of claim 1.

Figure 4 of the Alivisatos patent displays a transmission electron micrograph of crystalline cadmium sulfide particles, referred to in the patent as clusters, on an aluminum substrate. See, for example, column 3, lines 32-36. The higher magnifications in Figure 3 of the Alivisatos patent show the lattice of the crystalline particles. See, for example, column 3, lines 27-31. The cadmium sulfide particles/clusters are organized into a self-assembled structure. See, Figure 1 of the Alivisatos patent. The self-assembly is driven by the linker compounds that bond with one functional group with the metal surface and with a second functional group with

the particles. The nature of self-assembled monolayers is described in column 1 of the Alivisatos patent.

The particles/clusters are comprised of atoms within the lattice and are not self-assembled according to any reasonable interpretation of the terminology. See column 2 of the Alivisatos patent, especially lines 37-38 ("semiconductor nanocrystals, also referred to herein as clusters). Thus, **Figure 4 of the Alivisatos patent does not disclose a plurality of self-assembled structures**, since it displays a portion of a single self-assembled structure made up of nanocrystals, i.e., particles. Since Figure 4 does not disclose a plurality of self-assembled structures, Figure 4 cannot be the basis of an anticipation rejection.

The other language pointed to by the Examiner is at column 6, lines 1-14. This description, which actually starts at column 5, line 65, summarizes what is described in the Examples of the Alivisatos patent. Specifically, "the preparation of monolayers of semiconductor nanocrystals covalently bound to inorganic surfaces is described." As described at column 6, lines 13-15, "[b]oth techniques result in durable films of dispersed clusters, homogeneous on a μm scale with approximately 0.5 monolayer coverage. Thus, this description describes the formation of a single structure that is "homogenous" across the surface. This description does not describe a plurality of self-assembled structures. As described at column 11, lines 24-26, Figure 4 shows a random section of the layer on the surface. The resulting half monolayer coverage results from the gaps between particles as shown in Figure 4 and not due to localization of the particles on the surface.

Furthermore, the Alivisatos patent does not describe selection of domains for the localization of self-assembled structures. **Suitable localization processes, distinct from the self-assembly process (referred to as a boundary defining process) are described in detail in Applicants' specification**, for example, at page 7, lines 4-16 page 39, lines 5-32 and page 45,

line 32 to page 47, line 28. **These concepts and corresponding structures, which are explicitly in Applicants' claims, are completely lacking in the Alivisatos patent.**

The formation of a "homogenous" film described in the Alivisatos patent has no relationship with the separate, selected locations as claimed by Applicants due to **a lack of a plurality of self-assembled structures as well as a lack of a localization and a lack of selection for the placement of the localized structures**. The Alivisatos patent simply does not teach several features of Applicants' claimed invention, and it similarly does not teach the claimed relationship between the elements. Since the Alivisatos patent does not disclose several claimed features of Applicants' invention or their relationship to each other, the Alivisatos patent does not anticipate Applicants' claimed invention. This rejection should be withdrawn.

Group 3 Claim

Claim 7 depends from claim 1. Therefore, claim 7 is patentable over the Alivisatos patent for the reasons described above under the group 1 analysis. Furthermore, the Examiner has not asserted that the Alivisatos patent discloses nanoscale particles **within pores**. Therefore, the Examiner clearly has not asserted a prima facie case of anticipation with respect to claim 7. This rejection should be withdrawn.

Summary of Anticipation Rejections

The Alivisatos does not teach several claimed features of Applicants' invention or their claimed relationship to each other. Thus, the Alivisatos patent clearly does not anticipate Applicants' claimed invention. Applicants respectfully request withdrawal of the rejection of claims 1 and 8-12 under 35 U.S.C. § 102(b) as being anticipated by the Alivisatos patent.

CONCLUSIONS

Applicants submit that claims 1, 4-16, and 41-53 are patentable over the prior art of record. Applicants believe that the Examiner has failed to establish prima facie unpatentability of any of the claims. Thus, Applicants respectfully request the reversal of the rejections of claims 1, 4-16 and 41-53 and the allowance of the claims.

Respectfully submitted,

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Peter S. Dardi
Peter S. Dardi

APPENDIX A

ASSIGNMENT FROM NEOPHOTONICS CORP. TO NANOGRAM CORP.

PATENT ASSIGNMENT AGREEMENT

THIS PATENT ASSIGNMENT AGREEMENT, by and between NeoPhotonics Corporation., a Delaware corporation formerly known as NanoGram Corporation, and having offices at 49040 Milmont Drive, Fremont, CA, 94538 (hereinafter referred to as "NeoPhotonics") and NanoGram Corporation, a Delaware corporation formerly known as PowerGram Corporation and that is a wholly owned subsidiary of NeoPhotonics as of the Effective Date (as defined below), and having offices at 49040 Milmont Drive, Fremont, CA, 94538 (hereinafter referred to as "NanoGram"), is effective as of January 20, 2003 (the "Effective Date")

WHEREAS, by virtue of assignments signed by inventors and/or recorded in the United States Patent and Trademark Office, NeoPhotonics is the current record owner of the right, title and interest, specified in such assignments, of the patent applications and issued or granted patents identified in **Exhibit A** (which is incorporated herein by this reference);

WHEREAS, NeoPhotonics desires to assign to NanoGram, and NanoGram desires to receive from NeoPhotonics such assignment of: (a) the patents and patent applications that are set forth in **Exhibit A**; and (b) all patents issued or granted, and all patent applications filed, in any country that claim or derive any right of priority from any of the patents or patent applications identified in (a) (including without limitation any and all reexaminations, reissues, divisionals, continuations, continuations-in-part (but only to the extent these continuations-in-part do not include new matter), and foreign counterpart applications of any of the patents or patent applications identified in (a)), but only to the extent that these patents and patent applications derive this right of priority (collectively, the patent applications and issued or granted patents identified in (a) or (b) shall be referred to as "Inventions"), and further including the right to sue for and collect damages from third parties, under any of the Inventions, arising from acts occuring prior to the Effective Date;

WHEREAS, NeoPhotonics desires to grant to NanoGram, NanoGram desires to receive from NeoPhotonics, a nonexclusive license (with right to sublicense) to use the trademarks set forth in **Exhibit A**, subject to NeoPhotonics' retention of certain quality control rights with respect to such use, as set forth below;

WHEREAS, NeoPhotonics desires to agree to assign to NanoGram, effective on the date NeoPhotonics has filed a Statement of Use with respect to any of the trademarks set forth in **Exhibit A**, such trademark, and associated goodwill.

NOW, THEREFORE, effective as of the Effective Date, for one dollar ($1.00) and other good and sufficient consideration, the receipt and adequacy of which is hereby acknowledged, NeoPhotonics and NanoGram agree as follows:

1. NeoPhotonics assigns to NanoGram, and NanoGram accepts from NeoPhotonics such assignment of, all rights, title and interest in and to the Inventions, and further including the right to sue for and collect damages from third parties, under any of the Inventions, arising from acts occuring prior to the Effective Date.

2. NeoPhotonics hereby grants to NanoGram a worldwide, nonexclusive, perpetual, royalty-free, fully paid-up license to use the Trademarks (including use of "NANOGRAM" in its corporate name, trade names, trademarks and service marks) subject to NeoPhotonics' retention of quality control rights with respect to such use (as set forth in NeoPhotonics' Trademark Quality Control Guidelines, a copy of which will be provided to NanoGram within sixty (60) days after the Effective Date). From the Effective Date until the date NeoPhotonics has filed the Statement of Use with respect to any Trademark, NanoGram will not register such Trademark, or any trademarks that are confusingly similar to such Trademark, in any jurisdiction without NeoPhotonics's prior written consent, and NanoGram's (and its sublicensees) use of such Trademark shall inure to the benefit of NeoPhotonics. NanoGram shall have the right to grant sublicenses (and grant the right to grant further sublicenses under such sublicense) under the foregoing license to the Trademarks in connection with the manufacture, use, sale, importation, distribution, advertising, promotion and other commercial exploitation of its sublicensees. NeoPhotonics agrees to assign to NanoGram, effective on the date NeoPhotonics has filed a Statement of Use with respect to any of the trademarks set forth in **Exhibit A**, such trademark, and associated goodwill. After the date NeoPhotonics has filed the Statement of Use with respect to any Trademark, NeoPhotonics will not register such Trademark, or any trademarks that are confusingly similar to such Trademark, in any jurisdiction without NanoGram's prior written consent.

3. NeoPhotonics hereby represents and warrants that NeoPhotonics has not granted, and hereby covenants that NeoPhotonics will not grant, to any third party any right, title or interest to any of the Inventions or the Trademarks.

4. NeoPhotonics will execute, acknowledge, and deliver to NanoGram (and will cause its employees and contractors named as inventors on any of the Invention to execute, acknowledge, and deliver to NanoGram) such further documents and instruments, and do all such other acts (including without limitation providing testimony), as may be necessary or appropriate to (a) assist NanoGram to file, prosecute, obtain, maintain, perfect and/or enforce any and all of NanoGram's rights, title and interest in any and all countries, in and to all Inventions and Trademarks, or (b) carry out the purpose(s) or intent of this Agreement.

5. This Agreement shall be governed in all respects by the laws of the United States of America and by the laws of the State of California, as such laws are applied to agreements entered into and to be performed entirely within California between California residents. Except for actions seeking to enforce any order or any judgment of any federal or state court(s) located in California, any legal action, suit or proceeding arising out of or relating to this Agreement or the transactions contemplated hereby must be instituted exclusively in a court of competent jurisdiction, federal or state, located within the State of California, or in the U.S. International Trade Commission,, and in no other jurisdiction. Each party further irrevocably consents to personal jurisdiction and venue in, and agrees to service of process issued or authorized by, any such court. If any provision of this Agreement is held by a court of law to be illegal, invalid or unenforceable, (i) that provision shall be deemed amended to achieve as nearly as possible the same economic effect as the original provision, and (ii) the legality, validity and enforceability of the remaining provisions of this Agreement shall not be affected or impaired thereby. This Agreement and its provisions shall not be modified, amended or waived, except in a writing

executed by both parties. This Agreement, and **Exhibit A** that is hereby incorporated by reference, set forth the entire agreement and understanding between the parties as to the subject matter hereof, and supersede all prior or contemporaneous agreements, whether oral, written or based on a course of dealing or performance, concerning such subject matter. This Agreement may be executed (i) in one or more counterparts, each of which shall be an original and all of which shall constitute together the same document, and/or (ii) via facsimile signature.

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IN WITNESS WHEREOF, each of NeoPhotonics and NanoGram confirms that this Patent Assignment Agreement memorializes the understanding of the parties as of the Effective Date.

NEOPHOTONICS CORPORATION

By: _____

Name: T.S. JENKS

Title: CEO

State of California
County of San Mateo
On 1/22/03 before me, Cynthia Guglielmo
Name of Notary Public
Personally appeared Timothy S. Jenks
Name(s) of Signer(s)

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence
to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.
WITNESS my hand and official seal.

Signature of Notary Public

CYNTHIA GUGLIELMO
COMM. #1287572
NOTARY PUBLIC - CALIFORNIA
SAN MATEO COUNTY
My Comm. Expires Jan. 9, 2005

NANOGRAM CORPORATION

By: _____

Name: T.S. JENKS

Title: CEO.

State of California
County of San Mateo
On 1/22/03 before me, Cynthia Guglielmo
Name of Notary Public
Personally appeared Timothy S. Jenks
Name(s) of Signer(s)

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence
to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.
WITNESS my hand and official seal.

Signature of Notary Public

CYNTHIA GUGLIELMO
COMM. #1287572
NOTARY PUBLIC - CALIFORNIA
SAN MATEO COUNTY
My Comm. Expires Jan. 9, 2005

Exhibit A (Inventions and Trademarks)

Inventions

NGM Internal Docket No.	Matter	Serial Number	Filing Date
NG0001-US-01	For: ABRASIVE PARTICLES FOR SURFACE POLISHING	08/961,735	October 31, 1997
NG0001-US-02	For: ABRASIVE PARTICLES FOR SURFACE POLISHING (Continuation)	09/841,255	April 24, 2001
NG0001-US-03	For: SILICON OXIDE PARTICLES (Divisional)	09/731,286	12/6/2000
NG0001-TW-01	For: ABRASIVE PARTICLES FOR SURFACE POLISHING	87118136 (418245)	10/31/1998 (Published 1/11/2001)
NG0001-WO-01	For: ABRASIVE PARTICLES FOR SURFACE POLISHING	PCT/US98/23021 (WO 99/23189)	10/29/1998
NG0001-WO-EP	For: ABRASIVE PARTICLES FOR SURFACE POLISHING	9895402.2	
NG0001-WO-JP	For: ABRASIVE PARTICLES FOR SURFACE POLISHING	2000-519051 (2001-521979	(November 13, 2001)
NG0001-WO-KR	For: ABRASIVE PARTICLES FOR SURFACE POLISHING	10-2000-7004632	
NG0001-WO-SG01	For: ABRASIVE PARTICLES FOR SURFACE POLISHING	2000001819-2	
NG0001-WO-SG02	For: ABRASIVE PARTICLES FOR SURFACE POLISHING	200202585-6	4/30/2002
NG0002-US-01	For: SILICON OXIDE PARTICLES	09/085,514	5/27/1998
NG0002-TW-01	For: SILICON OXIDE PARTICLES	88108510	5/25/1999
NG0002-WO-01	For: SILICON OXIDE PARTICLES	PCT/US99/11257 (WO 99/61244)	5/20/1999
NG0002-WO-CA	For: SILICON OXIDE PARTICLES	2,333,259	5/20/1999
NG0002-WO-CN	For: SILICON OXIDE PARTICLES	998073464 (CN 1305411A)	12/13/2000 (July 25, 2001)
NG0002-WO-EP	For: SILICON OXIDE PARTICLES	99924420-5 (1082405)	(March 14, 2001)
NG0002-WO-JP	For: SILICON OXIDE PARTICLES	2000-550680 (2002-516351)	(June 4, 2002)
NG0002-WO-KR	For: SILICON OXIDE PARTICLES	10-2000-7013321	11/27/2000
NG0003-US-01	For: SURFACE CUTTING OF SILICON OXIDE WAFERS (Provisional)	60/262,273	1/17/2001
NG0004-US-01	For: ELECTROMAGNETIC SHIELDING	08/962,359	10/31/1997
NG0004-US-02	For: IRON OXIDE PARTICLES (Divisional)	09/337,826	6/22/1999
NG0004-TW-01	For: ELECTROMAGNETIC SHIELDING	87118135	10/31/98
NG0004-WO-01	For: ELECTROMAGNETIC SHIELDING	PCT/US98/23019 (WO 99/23862)	10/29/1998
NG0004-WO-CN	For: ELECTROMAGNETIC SHIELDING	98810604.3 (1277798A)	4/26/2000
NG0004-WO-EP01	For: ELECTROMAGNETIC SHIELDING	98956352.3	
NG0004-WO-EP02			
NG0004-WO-JP	For: ELECTROMAGNETIC SHIELDING	2000-519583 (2001-522150)	(November 13, 2001)
NG0004-WO-KR	For: ELECTROMAGNETIC SHIELDING	10-2000-7004513	4/27/2000
NG0005-US-01	For: MULTILAYERED OPTICAL DEVICES (Provisional)	60/243,491	10/26/2000
NG0005-WO-01	For: MULTILAYERED OPTICAL DEVICES (CIP Designating US)	PCT/US01/45762	10/26/2001
NG0006-US-01	For: INTEGRATED GRADIENT INDEX LENSES (Provisional)	60/288,533	5/3/2001
NG0006-US-02	For: INTEGRATED GRADIENT INDEX LENSES	10/138,754 (2002-0164119A)	5/3/2002 (11/7/2002)
NG0007-US-01	For: OPTICAL MATERIAL WITH SELECTED INDEX OF REFRACTION (Provisional)	60/262,274	1/17/2001
NG0007-WO-01	For: OPTICAL MATERIAL WITH SELECTED INDEX OF REFRACTION	PCT/US02/01702 (WO 02/057,812)	1/17/2002 (7/25/2002)
NG0008-US-01	For: PHOSPHORS	08/962,362	10/31/1997
NG0008-US-02	For: ZINC OXIDE PARTICLES (CIP)	09/266,202	3/10/1999
NG0008-US-03	For: ZINC OXIDE PARTICLES (Divisional)	09/970,279	10/3/2001

NGM Internal Docket No.	Matter	Serial Number	Filing Date
NG0008-TW-01	For: PHOSPHORS	87118133	10/31/1998
NG0008-WO-01	For: PHOSPHORS	PCT/US98/23134 (WO 99/23191)	10/29/1998
NG0008-WO-02	For: ZINC OXIDE PARTICLES	PCT/US00/06064 (WO 00/06064)	3/8/2000
NG0008-WO-CN	For: PHOSPHORS	98810602.7 (CN 1277627A)	4/26/2000
NG0008-WO-EP	For: PHOSPHORS	98956398.6	
NG0008-WO-JP	For: PHOSPHORS	2000-519052 (2001-521980)	(11/13/2001)
NG0008-WO-EP-02	For: ZINC OXIDE PARTICLES	00917798.1 (1166286)	
NG0008-WO-JP-02	For: ZINC OXIDE PARTICLES	2000-604425 (2002-539064A)	9/10/2001 (11/19/2002)
NG0008-WO-CN-02	For: ZINC OXIDE PARTICLES	00806379.6 (CN 1347561A)	10/18/2001 (5/1/2002)
NG0008-WO-KR-02	For: ZINC OXIDE PARTICLES	10-2001-7011395	9/7/2001
NG0008-WO-CA-02	For: ZINC OXIDE PARTICLES	2,364,262	3/8/2000
NG0009-US-01	For: COMBINATORIAL CHEMICAL SYNTHESIS (Provisional)	60/194,734	4/5/2000
NG0009-US-02	For: COMBINATORIAL CHEMICAL SYNTHESIS (PFP)	09/557,696	4/25/2000
NG0009-TW-01	For: COMBINATORIAL CHEMICAL SYNTHESIS	90107994	7/11/2000
NG0009-WO-01	For: COMBINATORIAL CHEMICAL SYNTHESIS	PCT/US01/10673	4/3/2001
NG0009-WO-EP	For: COMBINATORIAL CHEMICAL SYNTHESIS		
NG0009-WO-JP	For: COMBINATORIAL CHEMICAL SYNTHESIS	2001-576428	
NG0009-WO-KR	For: COMBINATORIAL CHEMICAL SYNTHESIS	10-2002-7013384	10/5/2002
NG0009-WO-CN	For: COMBINATORIAL CHEMICAL SYNTHESIS		
NG0010-US-01	For: PARTICLE PRODUCTION APPARATUS	09/362,631	7/21/1999
NG0010-TW-01	For: PARTICLE PRODUCTION APPARATUS	89113758	
NG0010-WO-01	For: PARTICLE PRODUCTION APPARATUS	PCT/US00/19578	7/18/2000
NG0010-WO-KR	For: PARTICLE PRODUCTION APPARATUS	10-200-7000869	1/21/2002
NG0010-WO-JP	For: PARTICLE PRODUCTION APPARATUS	2001-512027	7/18/2000
NG0010-WO-CN	For: PARTICLE PRODUCTION APPARATUS	00813151.1 (CN 1374883A)	3/21/2002 (10/16/2002)
NG0010-WO-EP	For: PARTICLE PRODUCTION APPARATUS	00947495.8 (EP 1230016)	(8/14/2002)
NG0011-US-01	For: TIN OXIDE PARTICLES	09/042,227	3/13/1998
NG0011-TW-01	For: TIN OXIDE PARTICLES	88103855	3/12/1999
NG0011-WO-01	For: TIN OXIDE PARTICLES	PCT/US99/05119	3/13/1999
NG0011-WO-CN	For: TIN OXIDE PARTICLES	9980367.9 (CN 129275A)	9/11/2000 (Pub. 4/25/2001)
NG0011-WO-EP	For: TIN OXIDE PARTICLES	9991236.0	
NG0011-WO-JP	For: TIN OXIDE PARTICLES	2000-535510 (2002-505993)	3/8/1999 (2/26/2002)
NG0011-WO-KR	For: TIN OXIDE PARTICLES	10-2000-7010042	3/8/1999
NG0012-US-01	For: ULTRAVIOLET LIGHT BLOCK AND PHOTOCATALYTIC MATERIALS	08/962,515	10/31/1997
NG0012-US-02	For: ULTRAVIOLET LIGHT BLOCK AND PHOTOCATALYTIC MATERIALS (Divisional)	09/566,476	5/8/2000
NG0012-TW-01	For: ARTICLES OR COMPOSITIONS COMPRISING NANOSCALE PARTICLES; METHODS OF UTILIZING OR PRODUCING SUCH PARTICLES	87118134	10/31/1998
NG0012-WO-01	For: ARTICLES OR COMPOSITIONS COMPRISING NANOSCALE PARTICLES; METHODS OF UTILIZING OR PRODUCING SUCH PARTICLES	PCT/US98/23018 (WO 99/23687)	10/29/1998
NG0012-WO-CN	For: ARTICLES OR COMPOSITIONS COMPRISING NANOSCALE PARTICLES; METHODS OF UTILIZING OR PRODUCING SUCH PARTICLES	98810600.0	

NGM Internal Docket No.	Matter	Serial Number	Filing Date
NG0012-WO-EP	For: ARTICLES OR COMPOSITIONS COMPRISING NANOSCALE PARTICLES; METHODS OF UTILIZING OR PRODUCING SUCH PARTICLES	98956351.5	
NG0012-WO-JP	For: ARTICLES OR COMPOSITIONS COMPRISING NANOSCALE PARTICLES; METHODS OF UTILIZING OR PRODUCING SUCH PARTICLES	2000-5129457 (2001-522130)	(11/13/2001)
NG0013-US-01	For: REACTANT DELIVERY APPARATUSES	09/188,670	11/9/1998
NG0013-US-02	For: REACTANT DELIVERY APPARATUSES (Divisional)	09/753,484	1/3/2001
NG0013-WO-01	For: REACTANT DELIVERY APPARATUSES	PCT/US99/26342 (WO 00/27523)	11/8/1999
NG0013-WO-CA	For: REACTANT DELIVERY APPARATUSES	2,349,945	11/8/1999
NG0013-WO-CN	For: REACTANT DELIVERY APPARATUSES	99813806.1 (CN 1328486A)	(12/26/2001)
NG0013-WO-EP	For: REACTANT DELIVERY APPARATUSES	99956959.3 (EP 1131154)	(9/12/2001)
NG0013-WO-JP	For: REACTANT DELIVERY APPARATUSES	2000-50743 (2002-529224)	5/9/2001 (9/10/2002)
NG0013-WO-KR	For: REACTANT DELIVERY APPARATUSES	10-2001-7005858	5/9/2001
NG0014-US-01	For: COMPOSITE METAL OXIDE PARTICLES	09/188,768	11/9/1998
NG0014-US-02	For: LITHIUM MANGANESE OXIDES AND BATTERIES (CIP)	09/203,414	12/2/1998
NG0015-US-01	For: METHODS FOR PRODUCING LITHIUM METAL OXIDE PARTICLES	09/334,203	6/16/1999
NG0015-US-02	For: MULTIPLE METAL OXIDE SUBMICRON PARTICLES	10/271,925	
NG0016-US-01	For: COATING FORMATION BY REACTIVE DEPOSITION (Provisional)	60/241,200	10/17/2000
NG0016-US-02	For: COATING FORMATION BY REACTIVE DEPOSITION (PFP)	09/715,935	11/17/2000
NG0016-WO-01	For: COATING FORMATION BY REACTIVE DEPOSITION	PCT/US01/32413 (WO 02/325,88)	10/16/2001 (4/25/2002)
NG0016-TW-01	For: COATING FORMATION BY REACTIVE DEPOSITION	090125683	
NG0018-US-01	For: METAL (SILICON) OXIDE/CARBON COMPOSITE PARTICLES	09/123,255	7/27/1998
NG0018-US-02	For: TITANIUM OXIDE NANOPARTICLES (Continuation)	10/076,976	2/15/2002
NG0019-US-01	For: LITHIUM METAL OXIDES	09/595,958	6/19/2000
NG0019-TW-01	For: LITHIUM METAL OXIDES	90114845	6/19/2001
NG0019-WO-01	For: LITHIUM METAL OXIDES	PCT/US01/40979	6/14/2001
NG0020-US-01	For: PHOSPHATE POWDER COMPOSITIONS AND METHODS FOR FORMING PARTICLES WITH COMPLEX ANIONS	09/845,985	4/30/2001
NG0020-WO-01	For: PHOSPHATE POWDER COMPOSITIONS AND METHODS FOR FORMING PARTICLES WITH COMPLEX ANIONS	PCT/US02/12069 (WO 02/089233)	4/18/2002 (11/7/2002)
NG0020-TW-01	For: PHOSPHATE POWDER COMPOSITIONS AND METHODS FOR FORMING PARTICLES WITH COMPLEX ANIONS	091108970	4/30/2002
NG0021-US-01	For: HIGH LUMINESCENCE PHOSPHOR PARTICLES	09/843,195	4/26/2001
NG0021-WO-01	For: HIGH LUMINESCENCE PHOSPHOR PARTICLES	PCT/US02/12146 (WO 02/088019)	4/18/2002 (11/7/2002)
NG0021-TW-01	For: HIGH LUMINESCENCE PHOSPHOR PARTICLES	091108685	4/26/2002
NG0022-US-01	For: POLYMER-INORGANIC PARTICLE COMPOSITES (Provisional)	60/265,169	1/26/2001
NG0022-US-02	For: POLYMER-INORGANIC PARTICLE COMPOSITES (PFP)	09/818,141	3/27/2001
NG0022-WO-01	For: POLYMER-INORGANIC PARTICLE COMPOSITES	PCT/US02/02054 (WO 02/058928)	1/23/2002 (8/1/2002)
NG0022-TW-01	For: POLYMER-INORGANIC PARTICLE COMPOSITES	91101259	1/25/2002
NG0023-US-01	For: INTENSE LIGHT FOR OPTICAL DEVICE FORMATION (Provisional)	60/295,689	6/4/2001
NG0024-US-01	For: METAL OXIDE PARTICLES	09/188,770	11/9/1998
NG0024-US-02	For: METAL OXIDE PARTICLES (Divisional)	09/697,697	10/26/2000
NG0024-WO-01	For: METAL OXIDE PARTICLES	PCT/US99/26343	11/8/1999

NGM Internal Docket No.	Matter	Serial Number	Filing Date
		(WO 00/27754)	
NG0024-WO-CA	For: METAL OXIDE PARTICLES	2,350,201	
NG0024-WO-CN	For: METAL OXIDE PARTICLES	99814156.9 (CN 1329575A)	(1/2/2002)
NG0024-WO-EP	For: METAL OXIDE PARTICLES	99957527.7 (1165442)	
NG0024-WO-JP	For: METAL OXIDE PARTICLES	2000-580940 (2002-529352)	5/9/2001 (9/10/2002)
NG0024-WO-KR	For: METAL OXIDE PARTICLES	10-2000-7005801	5/8/2001
NG0025-US-01	For: ALUMINUM OXIDE PARTICLES	09/136,483	8/19/1998
NG0025-US-02	For: PARTICLE DISPERSIONS	09/433,202	11/4/1999
NG0025-TW-01	For: ALUMINUM OXIDE PARTICLES	88113969	8/16/1999
NG0025-WO-01	For: ALUMINUM OXIDE PARTICLES	PCT/US99/18169	8/11/1999
NG0025-WO-02	For: PARTICLE DISPERSIONS	PCT/US00/30288	11/2/2000
NG0025-WO-CN	For: ALUMINUM OXIDE PARTICLES	99811839.7 (CN 1322185A)	April 6, 2001 (11/14/2001)
NG0025-WO-EP	For: ALUMINUM OXIDE PARTICLES	99942084.7 (EP 1129035)	
NG0025-WO-JP	For: ALUMINUM OXIDE PARTICLES	2000-566199 (2002-523327)	2/19/2001 (8/30/2002)
NG0025-WO-KR	For: ALUMINUM OXIDE PARTICLES	10-2001-7001980	2/16/2001
NG0025-WO-SG	For: ALUMINUM OXIDE PARTICLES	200100620-4	8/11/1999
NG0026-WO-01	For: VANADIUM OXIDE PARTICLES AND BATTERIES WITH ELECTROACTIVE NANOPARTICLES	PCT/US98/14947	7/20/1998
NG0026-WO-EP	For: VANADIUM OXIDE PARTICLES AND BATTERIES WITH ELECTROACTIVE NANOPARTICLES	98935816.3	
NG0026-WO-JP	For: VANADIUM OXIDE PARTICLES AND BATTERIES WITH ELECTROACTIVE NANOPARTICLES	2000-503563 (2001-510930)	(8/7/2001)
NG0026-TW-01	For: VANADIUM OXIDE PARTICLES AND BATTERIES WITH ELECTROACTIVE NANOPARTICLES	87115978 (420651)	(2/1/2001)
NG0027-US-01	For: ELECTRODES	09/435,748	11/8/1999
NG0027-TW-01	For: ELECTRODES	89123615 (488100)	(5/21/2002)
NG0027-WO-01	For: ELECTRODES	PCT/US00/30543	11/6/2000
NG0027-WO-JP	For: ELECTRODES INCLUDING PARTICLES OF SPECIFIC SIZES	2001-537112	5/8/2002
NG0027-WO-EP	For: ELECTRODES	00979141.9 (EP 124047)	(10/17/2002)
NG0027-WO-CN	For: ELECTRODES	00816633.1	6/3/2002
NG0027-WO-KR	For: ELECTRODES	10-2002-7005899	5/7/2002
NG0027-WO-IN	For: ELECTRODES	IN/PCT/2002/00738/CHE	5/20/2002
NG0028-US-01	For: PROCESS FOR CARBON PRODUCTION	08/986,878	12/8/1997
NG0028-TW-01	For: PROCESS FOR CARBON PRODUCTION	87120340	12/8/1998
NG0028-WO-01	For: PROCESS FOR CARBON PRODUCTION	PCT/US98/25833	12/4/1998
NG0028-WO-EP	For: PROCESS FOR CARBON PRODUCTION	98961927.5 (EP 1040216)	
NG0028-WO-JP	For: PROCESS FOR CARBON PRODUCTION	2000-524514 (2001-526164)	(12/18/2001)
NG0028-WO-KR	For: PROCESS FOR CARBON PRODUCTION	10-2000-7005841	
NG0030-US-01	For: SOLAR CELL	08/988,103	12/10/1997
NG0030-TW-01	For: SOLAR CELL	87120324	12/8/1998
NG0030-WO-01	For: SOLAR CELL	PCT/US98/25956	12/7/1998
NG0030-WO-BR	For: SOLAR CELL	PI-9813526-0	
NG0030-WO-CN	For: SOLAR CELL	98811755.x	
NG0030-WO-EP	For: SOLAR CELL	98960802.1 (EP 1038326)	

NGM Internal Docket No.	Matter	Serial Number	Filing Date
NG0030-WO-JP	For: SOLAR CELL	2000-524829 (2001-526466)	(12/18/2001)
NG0031-US-01	For: PARTICLE COLLECTION APPARATUS AND ASSOCIATED METHODS	09/107,729	6/30/1998
NG0031-WO-01	For: PARTICLE COLLECTION APPARATUS AND ASSOCIATED METHODS	PCT/US99/14061	6/23/99
NG0031-WO-CN	For: PARTICLE COLLECTION APPARATUS AND ASSOCIATED METHODS	99808011.x (CN 1307505A)	12/28/2000 (8/8/2001)
NG0031-WO-EP	For: PARTICLE COLLECTION APPARATUS AND ASSOCIATED METHODS	99924420.5	
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NG0032-US-02	For: BATTERIES WITH ELECTROACTIVE NANOPARTICLES (Continuation)	09/333,099	6/15/1999
NG0032-US-03	For: BATTERIES WITH ELECTROACTIVE NANOPARTICLES (Continuation)	09/606,884	6/29/2000
NG0035-US-01	For: SELF-ASSEMBLED STRUCTURES	09/558,266	4/25/2000
NG0035-TW-01	For: SELF-ASSEMBLED STRUCTURES		
NG0035-WO-01	For: SELF-ASSEMBLED STRUCTURES	PCT/US01/12851 (WO 01/81079)	4/20/2001 (11/1/2001)
NG0035-WO-EP	For: SELF-ASSEMBLED STRUCTURES		
NG0035-WO-JP	For: SELF-ASSEMBLED STRUCTURES	2001-578202	
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NG0050-US-02	For: OPTICAL MATERIALS AND OPTICAL DEVICES	10/099,597	3/15/2002
NG0050-TW-01	For: OPTICAL MATERIALS AND OPTICAL DEVICES		
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NG0051-WO-01	For: STRUCTURES INCORPORATING POLYMER-INORGANIC PARTICLE BLENDS	PCT/US02/24514	8/1/2002	
NG0051-TW-01	For: STRUCTURES INCORPORATING POLYMER-INORGANIC PARTICLE BLENDS	091117442	8/2/2002	
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NG0054-WO-01	For: Three Dimensional Engineering Of Optical Structures			
NG0054-TW-01	For: Three Dimensional Engineering Of Optical Structures			
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NG0065-US-01	For: HIGH RATE BATTERIES		7/22/2002	

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NG0017-US-01	For: HIGH RATE BATTERIES	09/649,752	8/28/2000	6,
NG0017-US-02	For: HIGH RATE BATTERIES (Divisional)	10/303,622	11/25/2002	
NG0017-WO-01	For: HIGH RATE BATTERIES	PCT/US01/41902	8/28/2001	N/
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NG0029-US-01	For: VANADIUM OXIDE NANOPARTICLES	08/897,778	7/21/1997	6,
NG0033-US-01	For: METAL VANADIUM OXIDE PARTICLES	09/246,076	2/5/1999	6,
NG0033-US-02	For: METAL VANADIUM OXIDE PARTICLES (Continuation)	09/757,519	1/9/2001	
NG0033-WO-01	For: METAL VANADIUM OXIDE PARTICLES	PCT/US00/02653 (WO 00/54291)	2/2/2000	N/
NG0033-WO-CN	For: METAL VANADIUM OXIDE PARTICLES	00804664.6 (CN 1343378A)	9/5/2001 (4/3/2002)	
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NG0033-WO-EP	For: METAL VANADIUM OXIDE PARTICLES	00917798.1 (EP 1163703)	(12/19/2001)	
NG0033-WO-JP	For: METAL VANADIUM OXIDE PARTICLES	2000-297850 (2002-536286A)	8/6/2001 (10/29/2002)	
NG0033-WO-KR	For: METAL VANADIUM OXIDE PARTICLES	10-2001-7009899	8/4/2001	
NG0034-US-01	For: METAL VANADIUM OXIDE PARTICLES	09/311,506	5/13/1999	6,
NG0034-US-02	For: METAL VANADIUM OXIDE PARTICLES	10/113,998	4/1/2002	

Trademarks

Registered Trademarks:
NANOGRAM (75/980,293) (Battery field)

Intent to Use applications:
NANOGRAM (75/507,671)
(Other non-battery fields)
NGM (75/507,689)
LRD (76/177,530)
NANO ENABLED (78/127,294)

Other Trademarks:

The following NANOGRAM Logo (and all copyrights therein):

APPENDIX B

PENDING CLAIMS

1. A material having a layer, the layer comprising a plurality of self-assembled structures comprising compositions, wherein the structures are localized in separate, selected locations covering a portion of the layer in an integrated assembly and wherein the compositions comprise inorganic particles.

4. The material of claim 1 wherein the inorganic particles have an average secondary particle diameter from about 2 nm to about 200 nm.

5. The material of claim 1 wherein the inorganic particles have an average secondary particle diameter less than about 100 nm and the primary particles having a distribution in sizes such that at least about 95 percent, of the primary particles have a diameter greater than about 40 percent of the average diameter and less than about 160 percent of the average diameter.

6. The material of claim 1 wherein the particles include effectively no primary particles with a diameter greater than about a factor of four times the average particle size.

7. The material of claim 1 wherein the particles have an average secondary particle diameter less than about 100 nm, the particles being located within pores of a material in the layer.

8. The material of claim 1 wherein the particles comprise a metal oxide.

9. The material of claim 1 wherein the compositions are attached to the surface with a linker molecule.

10. The material of claim 9 wherein the linker molecule comprises an organic compound with two functional groups.

11. The material of claim 1 wherein the particles are fluorescent particles or phosphorescent particles.

12. The material of claim 1 wherein the composition comprises a metal.

13. The material of claim 1 wherein the composition comprises a biological macromolecule.

14. The material of claim 1 wherein the composition comprises silica. (Claim assuming that the amendment of April 15, 2003 was entered.)

15. A material comprising a self-assembled formation of inorganic particles, the inorganic particles having an average primary particle diameter less than about 100 nm and the particles comprising a composition selected from the group consisting of metal/silicon oxides, metal/silicon carbides, metal/silicon nitrides and elemental metal.

16. The material of claim 15 wherein the primary particles have a distribution in sizes such that at least about 95 percent, of the primary particles have a diameter greater than about 40 percent of the average diameter and less than about 160 percent of the average diameter.

41. The material of claim 1 wherein the inorganic particles have an average primary particle diameter from about 2 nm to about 100 nm.

42. The material of claim 1 wherein the inorganic particles have an average primary particle diameter from about 12 nm to about 50 nm.

43. The material of claim 1 wherein the particles are in an ordered array within at least one of the self-assembled islands.

44. The material of claim 1 wherein the plurality of islands are located along different layers within the material.

45. The material of claim 15 wherein effectively no primary particles have a diameter greater than about a factor of four times the average primary particle size.

46. The material of claim 15 wherein the inorganic particles have an average primary particle diameter from about 2 nm to about 50 nm.

47. The material of claim 15 wherein the inorganic particles have an average secondary particle diameter from about 20 nm to about 400 nm.

48. The material of claim 15 wherein the inorganic particles are in an ordered array within the self-assembled formation.

49. The material of claim 15 wherein the self-assembled formation is integrated into an integrated assembly.

50. The material of claim 15 wherein the inorganic particles comprise a metal oxide.

51. The material of claim 15 wherein the inorganic particles comprise a phosphor composition.

52. The material of claim 15 wherein the inorganic particles comprise a material with an index of refraction suitable for transmitting visible light.

53. The material of claim 15 wherein the self-assembled structure has a photonic band gap that prevents propagation of light in any direction.